Harbors

Module NH2: Problem Identification, Inventory and Forecast, and Determination of Objectives and Constraints

Student Learning Objectives

Student will be able to:

- Identify problems and opportunities as they relate to navigation
- Determine the objectives and constraints to navigation improvements
- Establish the parameters needed for inventory and forecast

Development of Problem Statements

- May not be the same for all stakeholders
- Sort out real versus perceived problems
- For current and future
- Problem statement should include:
  - full description (e.g., answers who, what, where, when, why, how)
  - Who considers it's a problem

Development of Problem Statements

- Directly impacts shipping industry, exporters and importers
- Project area
  - Channel
  - Environment
  - Disposal
- Port service area
- Study area - areas affected by trade/traffic/project

Symptoms of Problems

- Physical Condition
- Traffic Delays
- Light Loading
- Lightering
- Safety Issues

Problems May Arise From Channel Configurations

- Depth/width
- Turning Areas
- Shoaling
- Location
  - Bends
  - Currents

Dredged Material Disposal Problems

- Capacity
- Cost
- Environmental Concerns

Information Gathering

- Types
  - Inventory
  - Forecast
- Uses
  - Defines relevant conditions in planning area under various scenarios
    - Historic (support rapid & sustained growth)
    - Existing
    - Base year
    - Most likely future with a project
  - Identify constraints

Data Parameters – Quantity

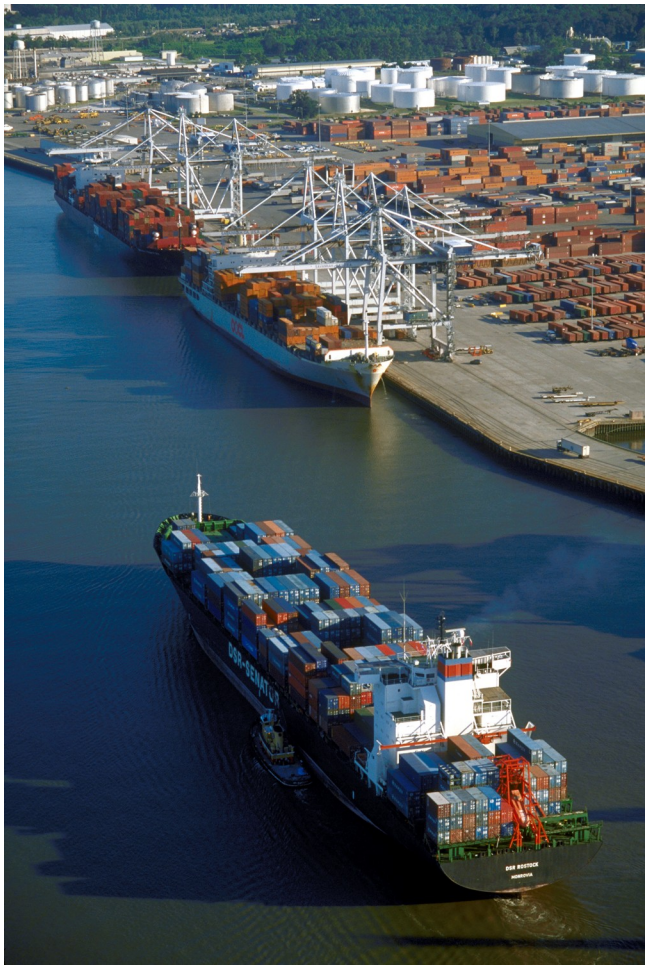
- Physical
  - Bathymetric, etc.
- Socioeconomic
  - Demographic – support trends
  - Geographic
    - Proximity to competing ports
    - Service area
  - Economic
  - Legal – i.e. disposal prohibitions

Data Parameters – Quality

- Representative
- Consistent
- Period of collected data sufficient to represent trends

Port Characteristics

- Terminals
- Berthing Depths
- Terminal Capacities
- Port Institutions
- Master Plan
- Data source - Port Series

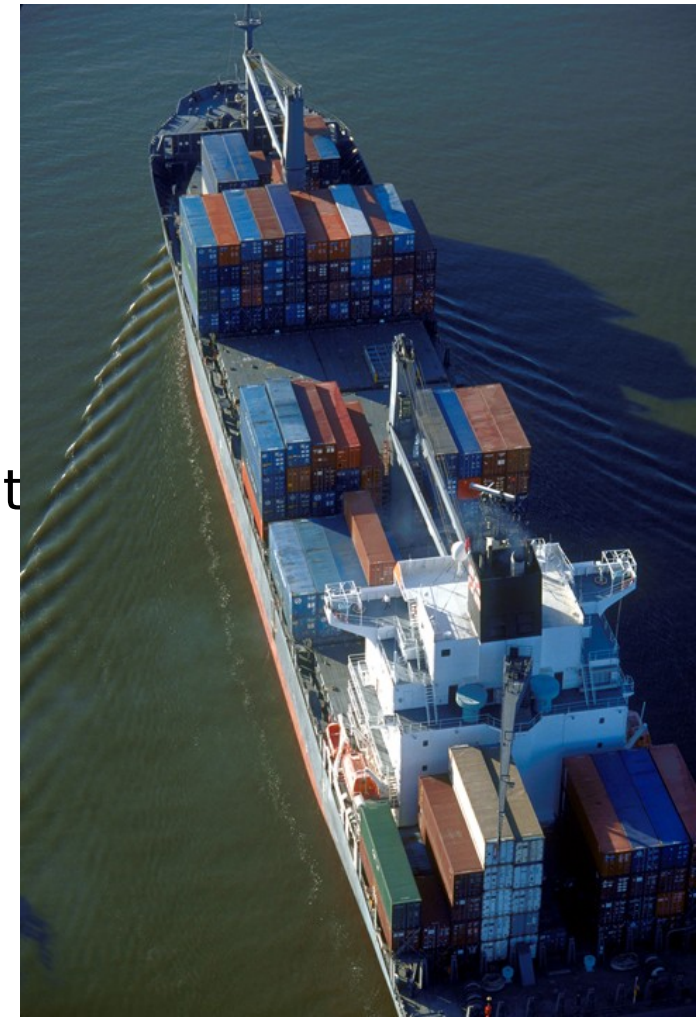


Characteristics for Commodities Affected by Delays/Capacity

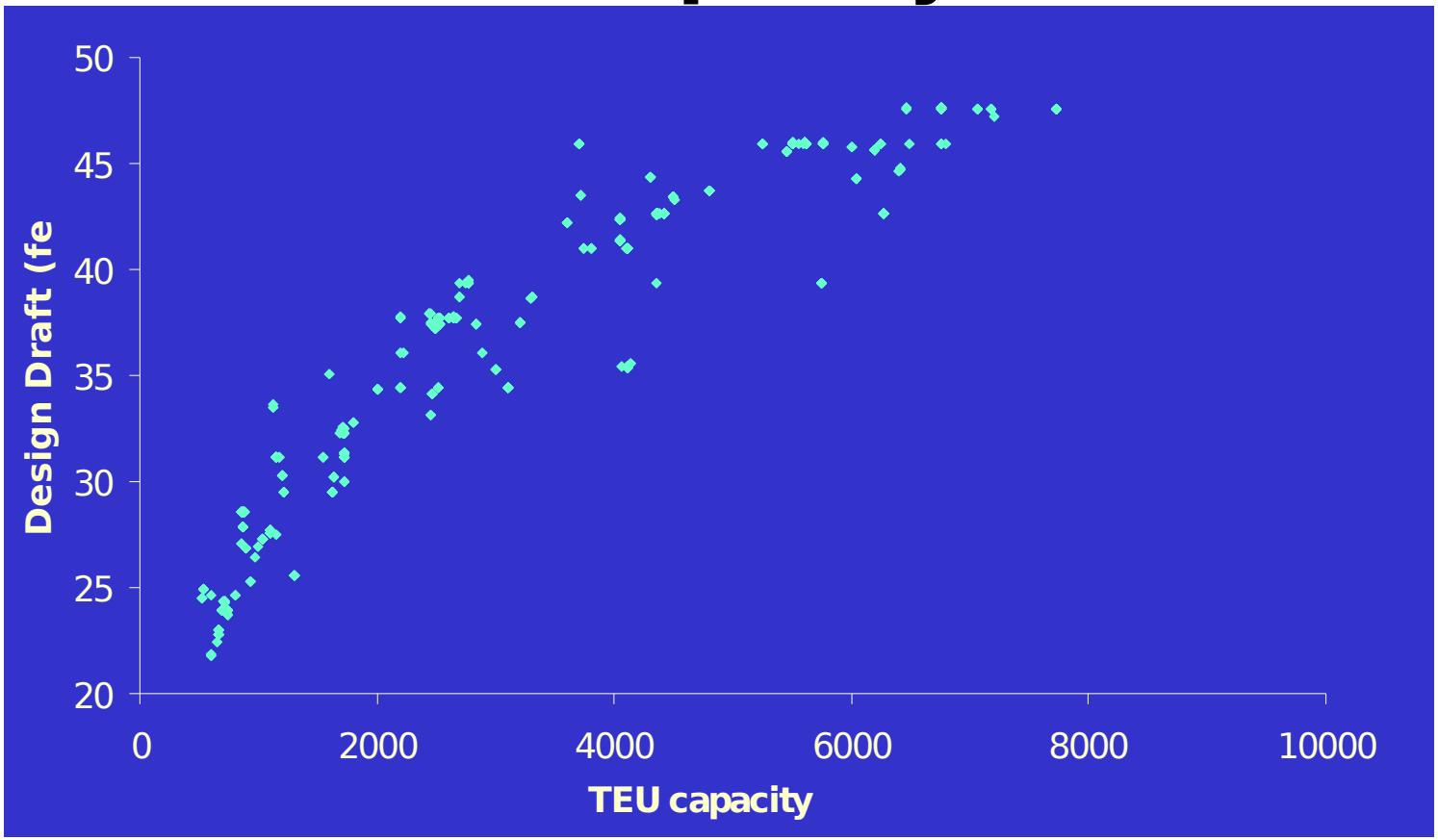
- Population
- Commodity movement
- Alternative mode information
- Trading patterns

Vessel Information

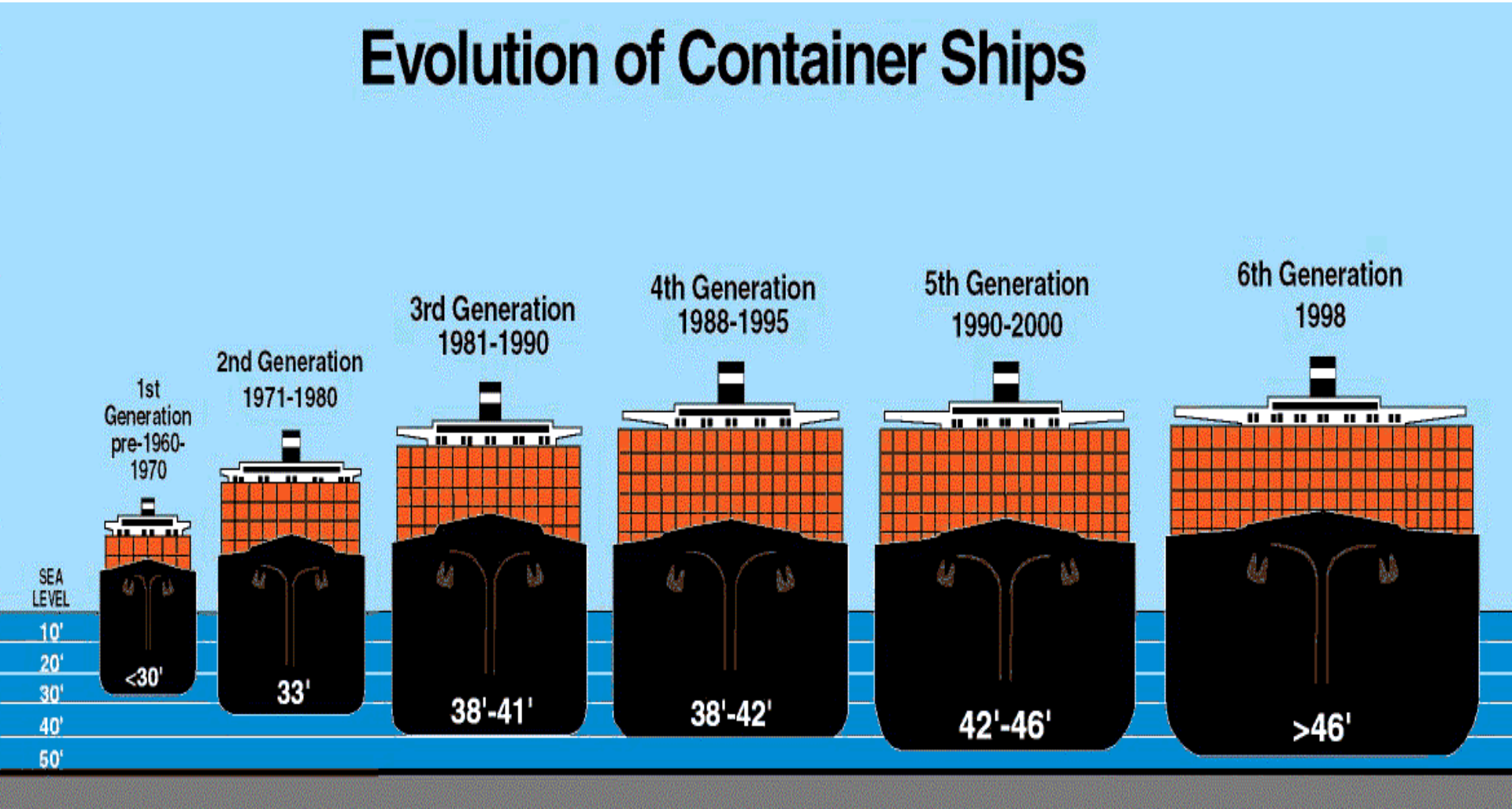
- Port vessel fleet
- Vessel size data
- Vessel operating drafts
  - limited by general navigation feat
  - design versus operating
- Vessel operating costs
- Vessel capacity utilization
- Vessel itinerary
- Light loading analysis
- Changing legal requirements



Distribution of Design Draft and TEU Capacity



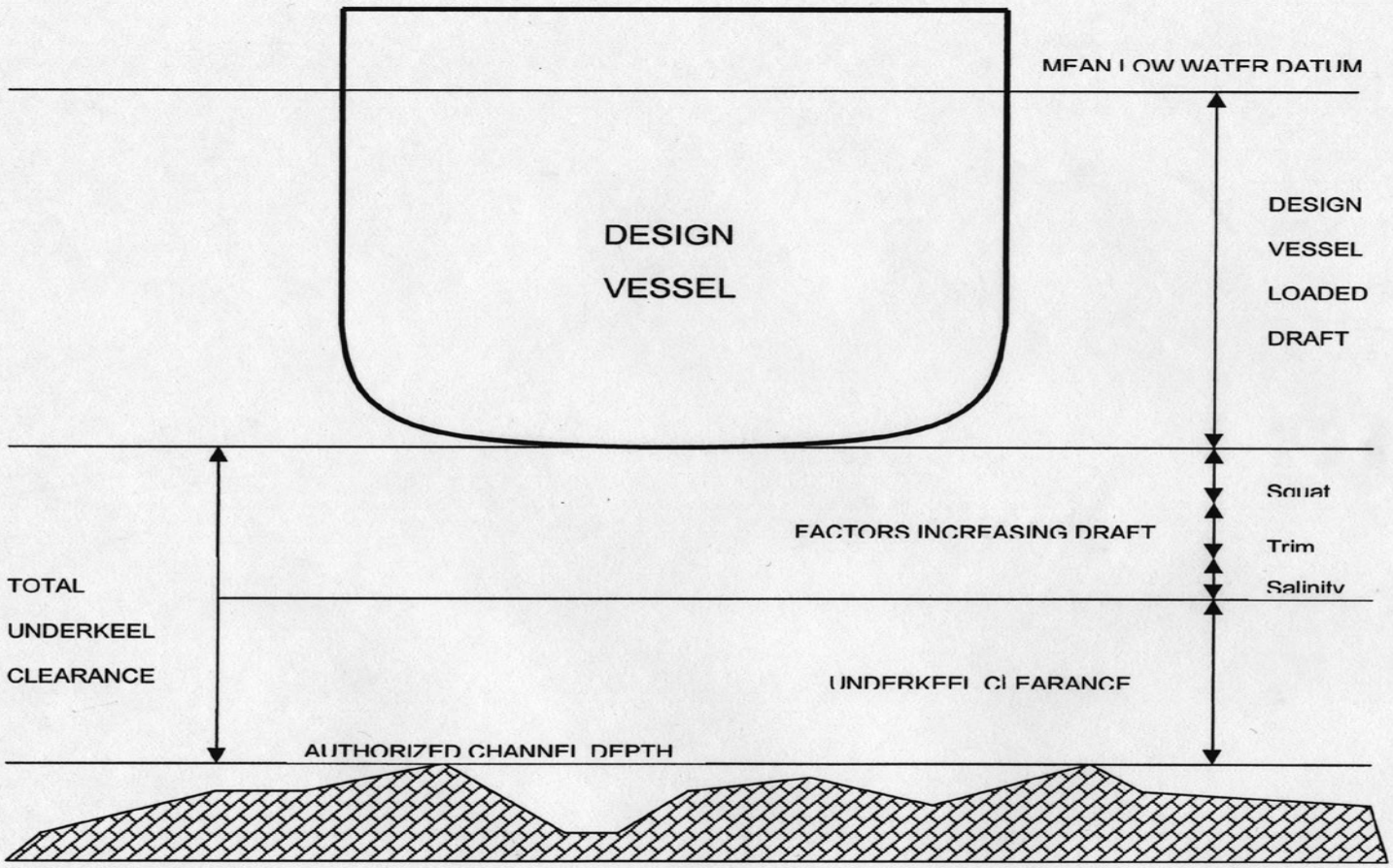
The Need for Deeper Channels



Large Containership Depth Requirements

Vessel Class	4000 TEU	7500 TEU
Design Draft	43	48
Underkeel Clearance	4	5
Required Depth	47	53
Estimated Light Loading	3	3
Actual Required Depth	44	50

Underkeel Clearance



U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

NEW YORK & NEW JERSEY HARBOR
NAVIGATION STUDY
PLAN FORMULATION

FIGURE 21
DESIGN VESSEL PARAMETERS

Existing Annual Transportation Costs

- Ship operating costs
- Origin-to-destination costs
  - Transit costs
  - Delay costs
- Landside/Port costs

Forecasting

- Forecast establishes the without project condition
- Economic benefits are dependent on forecasting
- Future demands are dependent on assumptions and the assumptions must be clearly articulated
- If you build it will they come? There must be supporting data
- Long-term solution versus short-term problem

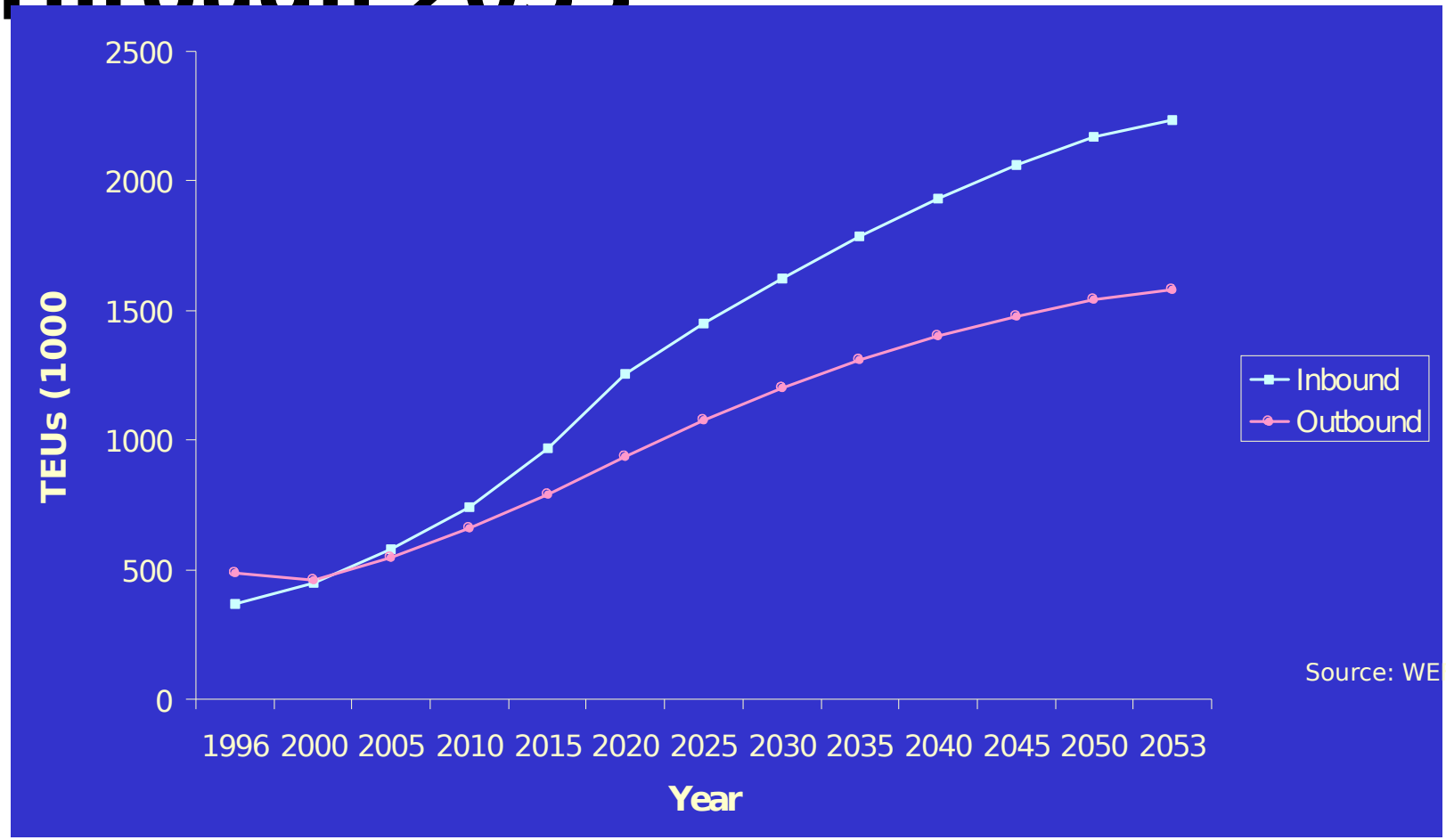
Forecasting Model Considerations

- Economic factors – Multiple Levels
  - International
  - Regional
  - Market
  - Enterprise (company)
- Government factors
  - Laws
  - Regulations
  - Monetary policies

Commodity Forecasts

- By type
- By volume
- By origin and destination
- By transportation mode
- Consult with IWR

Projected Total Container Throughput at Hampton Roads Through 2053



Forecast of Fleet Mix – 2 Components

- World fleet mix
  - Commercially available by industrial experts
  - Needs to be disaggregated to the port level
- Port fleet projections
  - Trend analysis – Need to ensure that ships are available which could be going to other ports/trade routes
  - Distribution accounting - Need a wide enough distribution of vessel sizes in the fleet mix

Institutional Setting Example: Stakeholder Groups

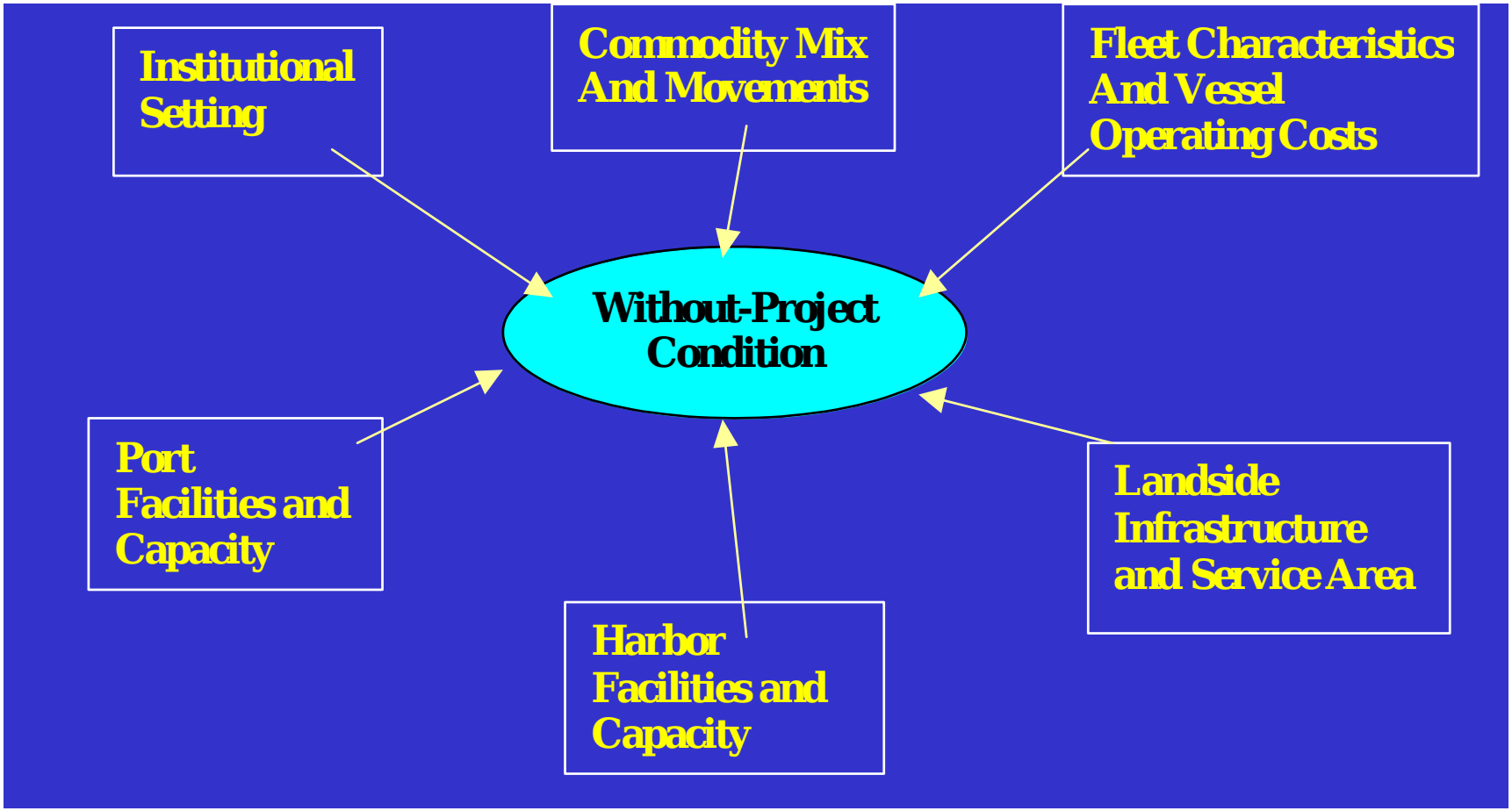
New York Harbor

- Public Institutions
  - Corps, USCG, USCS
  - Port Authority of New York and New Jersey
  - States, New York City, Newark, Bayonne
- Private Organizations
  - Carriers, Carrier Alliances, Pilots Associations
  - International Longshoreman's Association
  - New York Shipping Association
  - Maritime Association of the Port of NY & NJ
  - Harbor Safety, Navigation, and Operations Committee
  - Environmental Groups

Without Project Condition

- Product of forecasting
- Assumes nonstructural measures likely to occur
- Selected from alternative future conditions
- Assumptions need to be verified
- Specification of problem statements

Developing the Without-Project Condition



Planning Objectives

- Properties of objectives
  - Flexible - Accommodate alternative ways to achieve
  - Measurable – not nebulous
  - Attainable
  - Congruent – not rule out other objectives
- Avoid specifically seeking the solution

Planning Objectives - Examples

- Decrease costs that result from tidal delays associated with container vessels entering and leaving ……. Harbor.
- Decrease transportation costs through increases in economies of scale for dry bulk vessels delivering pot ash to …… Harbor.
- Reduce navigation hazards associated with submerged rocks located adjacent to the ….. Ship Channel.

Take Away Points

- Population, resource distribution, trading patterns, alternative transportation systems and forecasts of vessels fleet mixes need to be considered in the analysis of navigation systems.
- Data that is collected must be representative, consistent and the period of collected data must be sufficient to represent trends
- Economic and technical advances are engines of change. Future demands are dependent on assumptions and the assumptions must be clearly articulated

Where We are Going

Next, we'll cover:

- The identification of management measures
- The development and use of plan formulation strategies for navigation projects
- Some of the basics regarding the economic evaluation of navigation plans

Challenge Question:

How can we share lessons learned across teams?